

# Business Process Reengineering as a Tool in Total Quality Management makes Engineering Business Sense: A new Perspective and Model

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**Abstract—** Business process reengineering (BPR) first made its way into American management lexicon in earnest with the publication of Hammer and Champy's *Reengineering The Corporation: A Manifesto For Business Revolution*, in 1993. However, there were other writers' works that preceded this publication; notable among these are the publications by James Harrington. Although lack of standardization is not limited to reengineering, this management concept seems to take this problem to new heights as evidenced by prevalent inconsistencies even in the writings of the same authors. Regardless of how the various theorists and practitioners define reengineering, it seeks to take advantage of advances in technology to address the goal of cost cutting in organizations. Too often business managers' implementations of BPR have seemed to legitimize labor reductions. Somehow, quality improvement focus was lost in the shuffle. The premise here is that BPR's historical conceptualization and implementation has many pitfalls. These pitfalls are elaborated upon in this article, and an alternative view is presented as to how BPR should be conceptualized and implemented. This new approach integrates BPR into Total Quality Management (TQM); it also preserves workers' moral. Merging BPR into TQM shines a much needed positive light on BPR and strengthens the value continuous improvement doctrine in TQM. The "drastic" and "revolutionary" principles advocated by Hammer and Champy have caused unnecessary dislocations in businesses that implemented it as a separate business practice from TQM. The fundamental issue is the crystallization of what BPR really is. How should we view it? Is it a management strategy or is it a tool by which higher level management strategies such as TQM could be executed? We present an alternative conceptualization of business process reengineering. Therefore, this paper enhances not only engineering knowledge, but the business of engineering knowledge.

**Index Terms—** Business Process Reengineering, Engineering Management, Total Quality Management, Organizational Mission, Strategies, Tools.

## I. INTRODUCTION

In evaluating the literature on business process reengineering (BPR) our goal is to point out the shortcomings of BPR and the frameworks within which it has been implemented. We then propose an alternative method of conceptualizing business process reengineering. The goal is to integrate BPR as a tool into TQM strategy for synergies. The new framework would bring out BPR's effectiveness in implementation and application. The rest of this article is organized as follows. After a review of the literature that covers a discussion of TQM and BPR, we present the rationale for incorporating BPR into TQM. The role and scope of the two principles are also discussed. Subsequent to that, we present the validation,

conclusion, implication for practitioners and direction for further work.

## II. A REVIEW OF THE LITERATURE

The earliest known writer on the subject of business process improvement was James Harrington [1]. While he provided the seminal work in this new concept, there are some gaps that can be filled. For example, Harrington does not recognize the existence of internal customers. This is a significant departure from Deming's ideas on work design which recognizes the importance of internal customers [2]. Deming is still considered to be the authority on total quality management (TQM). As the Japanese would attest to following World War II, Deming elevated his mentor's work (Walter Shewhart) to new heights. He helped bring Japanese industrial complex back from the brink of extinction. Deming pointed out that satisfying both external and internal customers are equally important if an organization is to survive in a globally competitive environment. Further, Harrington's advocacy of evaluating all processes before selecting the best one for a given problem faced by an organization may not always be feasible. He also seems to have contradicted himself by devoting a whole chapter in his book on the importance of benchmarking. This is a contradiction because benchmarking against someone else's process implies copying what the other person is doing better than us. This does not meet Harrington's criterion of having the organization evaluate all alternative processes before selecting one. Furthermore, advocating benchmarking contradicts the very tenets of reengineering based on Hammer and Champy's presentation of BPR in 1993 [3, p.5].

According to Hammer and Champy, re-engineering is "the fundamental rethinking and radical redesign of business processes to bring about dramatic improvements in performance and profits" [3, p.32]. They go on to assert that reengineering cannot be carried out in small and continuous steps; it is an all-or-nothing proposition that produces dramatically impressive results [3, p.5]. From the foregoing, reengineering differs radically from other management tools such as materials requirement planning (MRP), manufacturing resource planning (MRP II), theory of constraints (TOC), or just in time (JIT), to name a few. These management tools explicitly recognize continuous improvement as a way to impact various aspects of any organization's endeavors, including quality. They emphasize both quality and productivity [4]. While these principles have their own features, they do not seek to completely abandon the cultures upon which the others have operated. This is unlike BPR.

For example, when the United States companies noticed that their economic leadership had evaporated by the 1980's, they searched for new ways to operate more efficiently and effectively. They turned to TQM, a part of which is "Just-in-time" manufacturing. This was a concept intended to lower costs by reducing inventories and better coordination of supplier/customer relationships. Along with this idea, "employee empowerment" was designed to train and permit those most closely associated with tasks or activities. This was meant to maximize quality and productivity while minimizing interference from the bureaucratic structures that American corporations had created. Each of these concepts was an important step forward, which could be integrated into the historically existing culture and tailored to fit existing operations with minimum dislocations. In fact, the Malcolm Baldrige Quality Award which started in 1986 epitomizes the belief in TQM as a way of enhancing business bottom lines over an extended period.

BPR, on the other hand, is somewhat extreme. Its fundamental underpinning is the marriage of the computer and telecommunications. It seeks to create new systems to support new ways of operating businesses rather than automating the existing ways of doing business [5, p.105]. Human resource factors are not of much importance in the reengineering paradigm. This is a problem to be revisited later in this paper.

### III. BUSINESS PROCESS REENGINEERING AND QUALITY

Does business process reengineering have much to do with quality? Does the implementation of reengineering have an impact on quality? Does BPR treat quality as a primary or secondary concern? How does it address long standing principles of engineering management such as continuous improvement? In the words of Hammer and Champy, reengineering is not the same as total quality management (TQM), or any other manifestation of the contemporary quality movement [3, p. 49]. They go on to say that while TQM programs work within the framework of a company's existing processes and seek to enhance them by means of what the Japanese call *kaizen*, or continuous improvement, reengineering seeks breakthroughs by discarding existing processes and replacing them with entirely new ones [3, p. 49]. We suggest that on the surface, BPR suffers from an old paradox that that TQM had prior to Deming. The paradox was that "quality" and "productivity" worked against each other [5]. BPR seems to focus on productivity and reduction in labor; quality seems to be on the back burner.

The champions of BPR (Hammer and Champy) emphasize that reengineering has nothing to do with "downsizing" or "rightsizing" [3, p. 47]. They state that when people lose their jobs (often in massive numbers) in most reengineering implementations, it is not intentional; but that it could be attributable to poor conception and execution of BPR principles. Since people's jobs, livelihood, loyalty, and pride of workmanship tend to be more of an afterthought in BPR, we suggest a new way to conceptualize it. The fact that

some companies embark on BPR (despite the high casualty rates) makes one wonder why this management tool appeals to them to begin with. Is it because it operates on a premise of instant dramatic increase in profits (albeit in the short term) due to layoffs? Or, is it based on a leap of faith that the promised dramatic increases in performance could be perpetuated? The former is what Dr. Deming calls the short-sightedness of U.S. companies.

How many organizations would implement business process reengineering if it called for getting rid of the very top managers in the organization? This apparent lack of sensitivity to the plight of the masses displaced by reengineering has had some negative implications for reengineering management. Many empirical studies show that BPR return on assets drops significantly during the project initiation year; and performance and productivity measures improve in a decreasing manner after project initiation. Research also suggests that BPR implementations on large scale enterprise-wide projects are risky, and sometimes lead to grand failures [7]. Other research using BPR in educational settings suggest that the initial enthusiasm for BPR has subsequently been tempered by a number of factors which include lack of Systems Development Methodologies (SDMs) to support the process [8, 9].

According to some proponents of BPR, the metrics of measuring the success of a reengineering effort are quality, service, cost, and cycle time. However, the writings of these authors offer no operational definition of quality. Furthermore, they explicitly state continuous improvement as a method for attaining quality and the other supposed benefits of reengineering [10, p. 4]. Of interest though is the fact that they revert to preaching continuous improvement theme as a method of achieving quality just after discarding it as a thing of the past. Johansson's list of factors that go into defining quality, service, costs, and cycle time are no different from what we already know. According to Johansson,  $Value = \frac{Quality * Service}{Cost * Cycle Time}$ .

The key to effecting a meaningful change or shift in paradigm is to first establish a point of commensurability [11, p.158]. The more familiar people are with the past history and present circumstances, the more receptive and comfortable they will be with new ideas or changes. Barker suggests that people use mental models, categorization, and transition functions in learning and decision making processes. So, the less radical a new situation is, the better the chance for success. This requires an evolutionary process (not revolutionary). We suggest that this is in line with TQM because which is based on continuous or evolutionary improvements (not revolutionary). Deming's view that management requires prediction and continuous improvement and Quinn's "logical incrementalism" strategy seem to be in agreement [12;13].

From a historical perspective, the power of continuous improvement was emphasized by a British engineer, Sir Robert Watson-Watts in the years leading up to WWII. Sir Watson-Watts was charged with figuring out a better solution based on his earlier research into using radio transmission and reception to detect aircraft at a distance. His work led to England's first early-warning radar system against

air attack. In explaining how he was successful in developing this system in a short period of time, Sir Watson-Watts outlined what has come to be called “Watson-Watt’s Law of the Third Best”. The key to his success was “logical incrementalism.” It is a rationale for logically selecting between technological alternatives [14].

The revolutionary nature of reengineering seems to bring about various uncertainties. These range from discomfort in perceptions of job security, fairness, and trust [15; 16, p.157]. Various BPR process flows have been suggested over the years. What they tend to have in common is that BPR is an n-step process [17; 18; 19]. For example, Morris and Brandon offer a 9-step process model of BPR. Although they refer to the 9-step model as being “dynamic”, it seems to be of open loop nature as shown in Figure1.

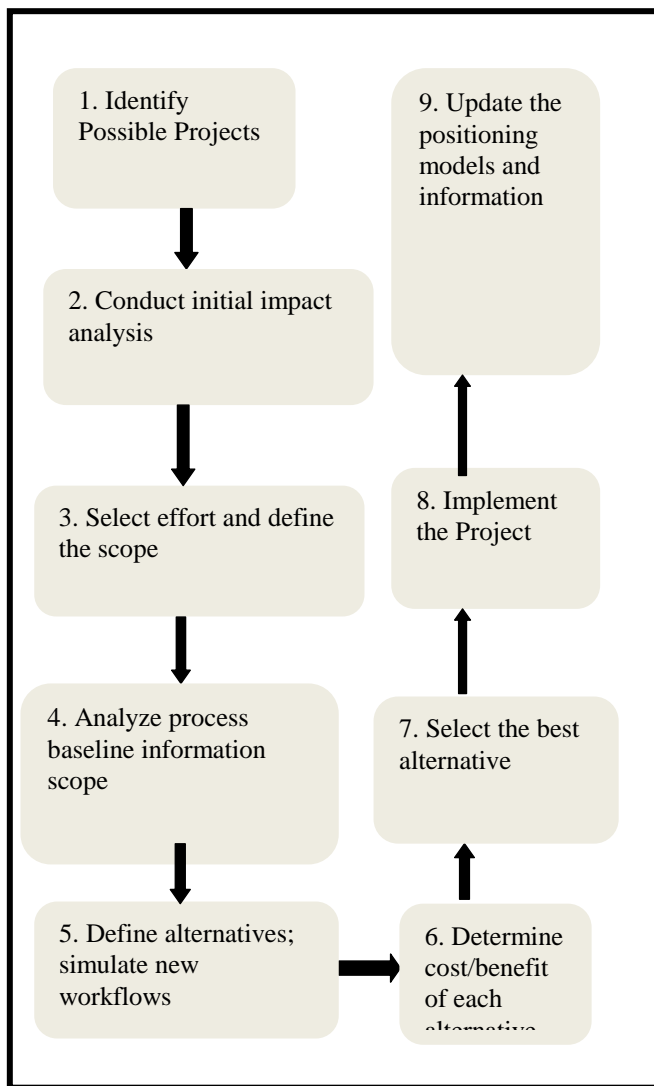


Figure 1: Morris and Brandon’s 9-Step BPR Process Flow  
(Source: Morris and Brandon, 1993).

Other BPR practitioners have presented frameworks that seem to put BPR at a higher level than Quality (or what they call “Improved Customer Service level). For example, in the journal article entitled “Modelling and analysis of business process reengineering, Gunasekaran and Kobu proposed the framework presented in Figure2 below [20]. As we point out later, there is a need to modify this view so that total quality

management is at a higher level. BPR should be one of the means or tools for executing quality.

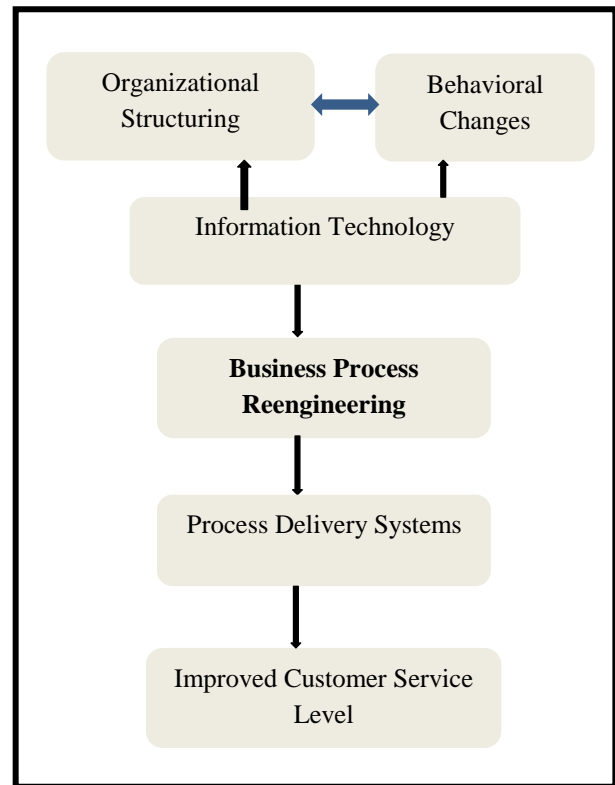


Figure 2: Modelling and analysis of business process reengineering.

(Source: Gunasekaran and Kobu, 2002).

Michael Hammer’s article, “Reengineering work: Don’t Automate, Obliterate” requires some revisiting [21]. According to Webster’s dictionary, “to obliterate” means “to eliminate completely so as to leave no trace” or “to wipe out”. Hammer and Champy have responded to critics as to why their BPR theory has attracted negative perceptions over time. They attribute the problems to “middle management resistance”. Perhaps, they are right, in that middle managers have tended to be among the big losers in terms of job losses [22, p.B1]. Furthermore, even Dr. Hammer’s conservative estimate indicates that over 70% of all reengineering projects fail. This is too risky, considering the fact that reengineering requires total organizational redesign. Thus, when it fails (and there’s a good chance it will) there is little left to salvage [5, p.105]. Perhaps this is what Hammer calls “obliteration”. As suggested by Womack and Jones, when individuals and functions are threatened by streamlined processes, the processes would not be streamlined for long [23, p.99). A focus on short-term profitability tends to lead to measures such as layoffs. BPR has had a negative perception resulting from improper implementation or unclear understanding of BPR.

As companies downsize (or reengineer), people problems become rampant. Even those who survive the initial cuts or layoff are afflicted with serious problems of “survivor syndrome”. This syndrome is rooted in fear and lack of trust. It leaves the organization’s survivors crushed, desolate, dejected, and despondent [24, p.A8). Business process reengineering gurus suggest that companies whose annual earnings are over \$100 million dollars are more suitable for

reengineering [25, p.9; 21, p.253]. However, given the size, bureaucracy, and the high stakes in larger organizations, this seems counter intuitive and incongruent with empirical studies [7]. Even big proponents of reengineering such as McElrath-Slath point out that “reengineering requires a spirit that’s willing to work on the edge.” She goes on to add that there are eight pitfalls to avoid when trying to implement BPR [26, p.56]. Incidentally, none of the eight pitfalls explicitly addresses quality concerns; again supporting our contention that reengineering does not seek to promote quality as its top objective.

Some have suggested that workers who lose their jobs as a result of reengineering should be able to retrain in new disciplines and get on with their lives. This proposition is oftentimes not feasible. What practical chance does a 55-year old accountant who lost his or her job have of retraining as an engineer and compete with professional engineers who may also be seeking new jobs? The problem of age discrimination is also there to contend with.

To cut to the chase, the focus in business process reengineering is not quality; it is cost cutting through the application of technology which often leads to replacement of people in the process of implementation. However, as stated earlier, it is possible, and indeed desirable to “reengineer” certain inefficient processes to take advantage of technology so as to stay more competitive in today’s global market place.

#### IV. RATIONALE FOR INCORPORATING BPR INTO TQM

As evidenced by the survey of current literature, reengineering is probably not the first option that an engineering manager should turn to as a means of addressing quality and other management problems. This is not to say that reengineering has no place in organizations. With careful analysis, it could be valuable in helping an organization improve some processes. We propose that BPR should be applied as an engineering management tool to be integrated into total quality management process. In the words of C.I. Lewis, knowledge building requires statistics because statistics is the basis for continuous improvement (or TQM). It enables engineering managers to gain more knowledge continuously.

In proposing the new business process reengineering framework, it is important to note that fundamental differences do exist between management “tools”, “management strategies”, and “mission”. An organization’s mission resides at the top level; it is a statement of the organization’s direction. A typical mission would provide a sense of the organization’s purpose for being; what it provides to society; and the boundaries and focus of what it provides. Right below the organizational mission is the organizational strategy. The organizational strategy is the high level action plans that outline how and what the organization will do to attain its mission. It focusses on the question “how?” Like missions, strategies are also developed at all levels of the organization. Strategy development is informed by Strengths, Weaknesses, Opportunities, and Threats (or SWOT Analysis) in order to attain the mission for a given level or function [27]. But we need tools to carry out strategies. A tool is a lower level instrument by which an organization performs the strategies that helps it attain its

mission. Management strategies such as Total Quality Management (TQM), Management by Objectives (MBO), etc. require tools to execute them. Historical examples of tools would be Just-In-Time (JIT), Material Requirements Planning (MRP), Theory of Constraints (TOC), etc. [4].

What we are proposing in this article is to integrate BPR as a tool to help execute TQM strategy. The proposed framework is as shown in Figure 3. As shown in the proposed model, Organizational mission drives all functional and sub-functional area missions. The organizational strategy also drives functional and indirectly, the sub-functional area strategies. The functional area strategies are also driven by functional area missions. This proposed integrated model has BPR driven by both the functional area strategies and the organizational strategy.

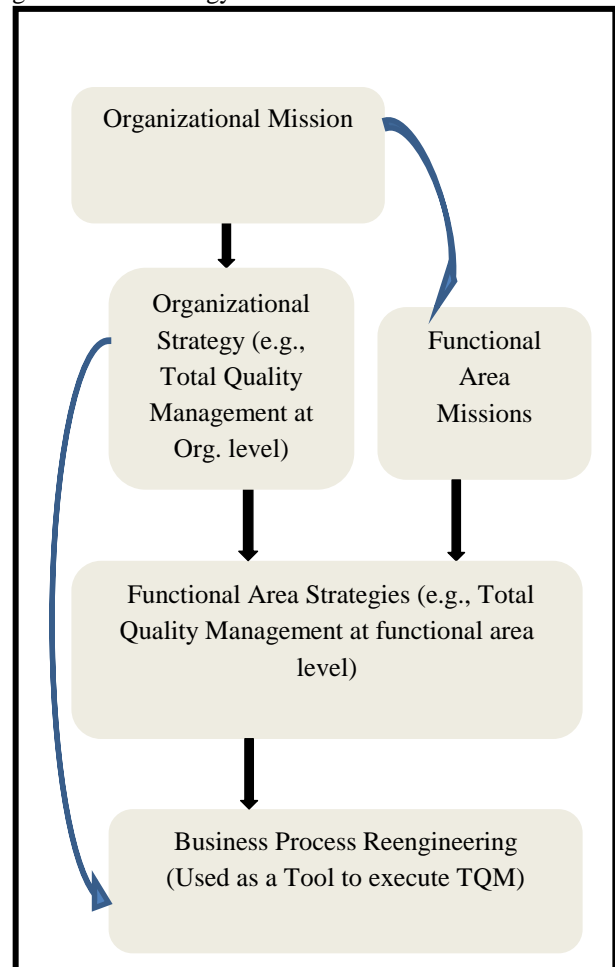


Figure 3: Proposed Model “Integrating Business Process Reengineering into TQM”.

We suggest that reengineering be viewed in a new light. This means modifying the definition so that we now approach it more from a continuous improvement standpoint as opposed to “total radical redesign”. Another factor to consider, especially during implementation, is the understanding of the organization’s socio-technical structure. Sustained competitiveness requires a fit between the people, the technology, and industry that the organization serves.

#### V. VALIDATION OF WORK AND CONCLUSION

In the validation of the proposed BPR/TQM framework, the main emphasis should be on satisfying the



user. But who is the user in a given organization? Is it the top managers? Could it be the employees or the stockholders? We propose a more encompassing view to include as many stakeholders within the organization and beyond. Continuous improvement (TQM) is facilitated by putting employees and the organization at the heart of organizational improvement efforts. The long term performance of an organization (using a score card) could be used as a surrogate for measuring the effectiveness of the integrated framework.

It should be pointed out that the Malcolm Baldrige Award is the highest honor that any American company could earn. The main impetus for the award is proven quality improvement and business results. As has already been pointed out, quality is not the primary concern in reengineering; cost cutting is. Worthy of note is the fact that all winners of the Baldrige award attribute their successes to their emphasis on excellent quality through continuous improvement [6; 4]. Some of the Baldrige Award winners have used BPR to support quality improvement. They include Hallmark, Taco Bell, Capital Holding, and Bell Atlantic [6]. The framework proposed here may help more organizations to be more successful. While integrating reengineering as a tool with TQM as a management strategy would require further empirical data, we believe that TQM and BPR will be bring about some synergies.

Some theorists and practitioners have not provided a concise or consistent view on conceptualization and implementation of business process reengineering. Adopting the proposed framework and rationale outlined in this paper could help bring a positive image to business process reengineering. As with any management framework, the implementation of this proposition will require top management's support. Engineering managers, researchers, and practitioners are encouraged to conduct further testing and validation of the proposed framework in order to understand its full dynamics. We foresee minimal resistance from lower level employees because they will feel more comfortable with this modified version of reengineering because it is a tool they will use in continuous improvement, not employee replacement.

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